

Department of Health Report

The Tennessee Foodborne Illness Surveillance Network (FoodNet)

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Foodborne diseases cause approximately 76 million illnesses in the United States each year, accounting for 325,000 hospitalizations and 5,000 deaths.¹ Foodborne illness has been estimated to cost as much as \$23 billion annually in this country.² Given the high incidence, foodborne diseases are likely to be encountered commonly by physicians, and responding appropriately can help limit associated morbidity.

The most common known causes of foodborne illness in the United States are listed in Table 1. Many people are surprised to learn that Norwalk-like virus is the most commonly identified cause of foodborne illness. Even in the United States, 82% of foodborne illness is caused by unknown pathogens. This high rate of "unexplained" illness can be attributed to a variety of factors, including delayed reporting and inadequate investigation, failure to collect appropriate specimens for laboratory testing, illness due to viruses or other organisms that are difficult to identify, and as-yet-unidentified pathogens.

Surveillance for Foodborne Illness

In Tennessee, as in other states, the most common causes of foodborne illness are required to be reported to the Department of Health, which monitors surveillance data and investigates cases as appropriate. The traditional surveillance system is a "passive" one, relying on clinicians, laboratories, and hospitals to report "notifiable diseases" by telephone or in writing to their local health departments. Under the present system, it is commonly believed that only a small proportion of notifiable diseases are ever reported to the Department of Health. This highlights the importance of health care providers promptly notifying their local health departments about all cases of notifiable diseases (a list can be obtained by calling your local health department or the Tennessee State Health Department at 615-741-7247).

Routine surveillance in Tennessee in 1999 identified 653 cases due to *Shigella*, 563 cases to *Salmonella*, 257 cases to *Campylobacter*, and 54 cases to *E. coli* O157:H7. Isolates of

TABLE 1

MOST COMMON KNOWN* CAUSES OF FOODBORNE ILLNESS IN THE UNITED STATES†

Disease Agent	% of Total Estimated Foodborne Illness
Norwalk-like viruses	66.6
<i>Campylobacter</i>	14.2
<i>Salmonella</i>	9.7
<i>Clostridium perfringens</i>	1.8
<i>Giardia lamblia</i>	1.4
Staphylococcus food poisoning	1.3
<i>Toxoplasma gondii</i>	0.8
<i>Yersinia enterocolitica</i>	0.6
<i>Shigella</i>	0.6

* 82% of foodborne illness in the U.S. is caused by unknown pathogens.

† Adapted from Mead, EID 1999.

all cases due to these organisms are required to be sent to the Tennessee Department of Health laboratory, where they are confirmed and additional testing possibly performed.

FoodNet: A New System for Active Surveillance

In 1999, Tennessee began participating in the Centers for Disease Control and Prevention (CDC) Foodborne Diseases Active Surveillance Network (FoodNet). FoodNet is the foodborne disease component of the Emerging Infections Program. It is a collaborative project with nine states, the CDC, the Food and Drug Administration, and the U.S. Department of Agriculture. In Tennessee, FoodNet surveillance is performed in Davidson, Cheatham, Dickson, Hamilton, Knox, Robertson, Rutherford, Shelby, Sumner, Williamson, and Wilson counties (Fig. 1).

FoodNet carries out active surveillance for the following pathogens: *Salmonella*, *Shigella*, *Campylobacter*, *E. coli* O157:H7, *Vibrio*, *Yersinia*, *Listeria*, *Cryptosporidium*, and *Cyclospora*. The program aims to identify all cases of these



Figure 1. Tennessee counties targeted for active surveillance in FoodNet.

From the Tennessee Department of Health, Nashville. Dr. Jones, epidemiologist, is FoodNet Director at TDH.

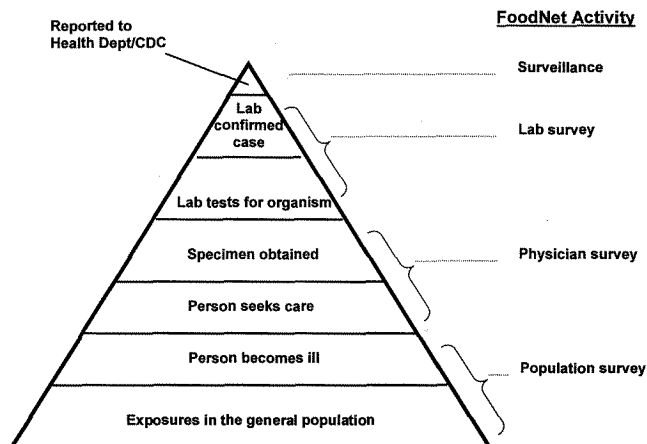


Figure 2. Burden of illness pyramid. Only a small proportion of foodborne illnesses are laboratory confirmed and reported to the health department. FoodNet involves several studies aimed at determining the factors which affect the many other steps which must occur before illnesses are reported (adapted from CDC materials).

illnesses in a defined population in Tennessee so that accurate disease rates can be calculated. Through *active surveillance*, all microbiology laboratories in these areas are visited regularly by health department staff to ensure that new cases of foodborne disease are reported to the state and the CDC. Though FoodNet active surveillance currently includes only these bacterial and parasitic agents, the Department of Health continues to monitor outbreaks from any cause, including Norwalk-like virus.

Because only a small proportion of foodborne illnesses are laboratory confirmed and reported to health departments (Fig. 2), FoodNet also includes several special projects to better understand the burden of foodborne illness in the United States. These include telephone surveys to assess the incidence of foodborne illness in the general population, physician surveys to determine clinician attitudes toward evaluating and preventing foodborne disease, and laboratory surveys to determine specimen handling practices (Table 2). Additional special projects attempt to use the intensive surveillance capabilities of FoodNet sites to better understand particular foodborne diseases and syndromes.

The growth of the FoodNet program in Tennessee has substantially improved the ability of the public health infrastructure to respond to foodborne illness in the state. Health department staff have participated in developing manuals and statewide training on investigating foodborne outbreaks, and work closely to support regional and county health departments in responding to public health needs. The state laboratory has added capabilities for identifying foodborne pathogens. The Tennessee Department of Health laboratory can now perform or arrange for polymerase chain reaction (PCR) testing for Norwalk-like virus, serology and augmented cul-

TABLE 2

SPECIAL FOODNET PROJECTS IN TENNESSEE

Active surveillance for all cases of nine common foodborne pathogens
Monitoring of foodborne disease outbreaks
Population survey to assess the burden of illness in the community
Surveillance for Hemolytic-Uremic Syndrome
Listeria case-control study
Survey of laboratory practices
Physician survey regarding foodborne disease education for patients
Enhancing laboratory capacity for diagnosis of foodborne illness (PCR for Norwalk-like virus, serology and augmented culture techniques for pathogenic *E. coli*, PFGE "fingerprinting" of bacterial pathogens)

turing techniques for *E. coli* O157:H7, stool testing for shiga-like enterotoxins, and pulsed field gel electrophoresis (PFGE) "fingerprinting" to determine the relatedness of bacterial isolates. PFGE testing is provided as part of PulseNet, a FoodNet program to allow rapid interstate comparison of bacterial DNA fingerprints, improving recognition and response to multi-state outbreaks.

Summary

Participation in FoodNet allows the Tennessee Department of Health to contribute to cutting-edge developments in monitoring and responding to foodborne illness in our own state and nationally. Tennessee-specific data on foodborne and other reportable diseases is available via the internet, by going to <http://www.state.tn.us/health/>, selecting "Programs and Services," then "Communicable Diseases," and then "Statistics." More information on the FoodNet program is available at: www.cdc.gov/ncidod/dbmd/foodnet or by calling the Tennessee FoodNet Program at (615) 741-7247. □

References

1. Mead PS, Slutsker L, Dietz V, et al: Food-related illness and death in the United States. *Emerg Infect Dis* 5:607-625, 1999.
2. Hedberg CW, MacDonald KL, Shapiro C: Changing epidemiology of foodborne disease: a Minnesota perspective. *Clin Infect Dis* 18:671-682S, 1994.

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